AMENDMENTS TO THE CLAIMS

Claim 1 (cancelled)

2. (previously presented) The method according to claim 3, wherein, when the method is applied for double exposure holographic interferometry, the development of the latent electrostatic image of a first exposure converts the latent electrostatic image into a latent image such as a photo-electret image, by pulse heating the AMS-film by applying a pulsating electric current on the transparent conducting sub-layer and subsequently illuminating the AMS-film by a flash-lamp followed by recharging the surface of the AMS-film to an initial operating surface potential.

3. (currently amended) A method for forming optical holograms on an amorphous molecular semiconductor (AMS) film deposited on a transparent conducting sub-layer comprising:

charging a surface of the AMS-film by a corona discharge up to a potential before local breakdowns begin to occur;

reducing the electron and hole components of the dark conductivity of the AMS-film by pulse heating the AMS-film when it has reached the operating surface potential;

initiating heating of the AMS-film for developing the

electrostatic image into a geometrical relief at a start temperature and heating the AMS-film at a heating rate;

creating a latent electrostatic image of a desired holographic image of an object on the surface of the AMS-film; and

developing the latent electrostatic image into a geometrical relief at the surface of the AMS-film,

wherein the AMS-film comprises about 92 wt% of a copolymer comprising N-epoxypropylcarbazole and about 5 wt% butylglycidyl ~~buthylglycedil~~ ether, doped with about 5 wt% of methyl-9-(4-dodecyl-oxyphenyl-1,3-selenathiol-2-ylidene)-2,5,7-trinitrofluorene-4-carboxylate and about 4 wt% of hexadecyl-2,7-dinitro-dicyanomethylenfluorene-4-carboxylate.

4. (previously presented) The method according to claim 3, wherein the starting temperature of the heating of the AMS-film, during development of the latent electrostatic image, is within the range from 15 to 40°C.

5. (previously presented) The method according to claim 3, wherein the heating rate of the AMS-film, during development of the latent electrostatic image, is in the order of 10^6 °C/sec.

6. (previously presented) The method according to claim 3, wherein, when the temperature of the AMS-film is within the range

from 15 to 40°C, the optimum charging potential of the film surface is 125 V/μm and the maximum charging current is 1 $\mu A/cm^2$.

7. (previously presented) The method according to claim 3, wherein the diffraction efficiency is measured with a photo-sensor installed in zero diffraction order.

8. (previously presented) The method according to claim 7, wherein the heating of the AMS-film, during development of the latent electrostatic image into a geometrical relief at the surface of the AMS-film, is terminated when the measured diffraction efficiency reaches a pre-set value in the range of 0.005-30% or if the time derivative of the measured diffraction efficiency reaches a termination condition.

9. (currently amended) The method according to claim 3 [[2]], wherein, when the latent electrostatic image is developed into a photo-electret image, the pulse pre-heating of the AMS-film is terminated when the measured diffraction efficiency of the restored holographic image reaches a pre-set value of 0.05%, and when the geometrical relief at the film surface, which corresponds to the developed image of the hologram, becomes erased in order to reset the AMS-film, the heating of the AMS-film is terminated when the measured diffraction efficiency of the restored holographic image

reaches a pre-set value of 0.01 %.

10. (previously presented) The method according to claim 8, wherein the termination condition is either when the calculated time derivative of the measured diffraction efficiency changes sign from a positive to a negative value or when the absolute value of the time derivative of the measured diffraction efficiency becomes less than a threshold value which is close to zero.

11. (previously presented) The method according to claim 9, wherein the photo-electret image has a lifetime of up to 20 hours.

12. (previously presented) The method according to claim 9, wherein the AMS-film achieves a holographic sensitivity of up to 1650 m^2/J, a resolution of up to 1700 mm^{-1}, and a signal-to-noise ratio up to 125.

Claims 13-17 (cancelled)

18. (currently amended) A method for forming optical holograms on an amorphous molecular semiconductor (AMS) film deposited on a transparent conducting sub-layer comprising:

charging a surface of the AMS-film by a corona discharge up to a potential before local breakdowns begin to occur;

reducing the electron and hole components of the dark conductivity of the AMS-film by pulse heating the AMS-film when it has reached the operating surface potential;

initiating heating of the AMS-film for developing the electrostatic image into a geometrical relief at a start temperature and heating the AMS-film at a heating rate;

creating a latent electrostatic image of a desired holographic image of an object on the surface of the AMS-film; and

developing the latent electrostatic image into a geometrical relief at the surface of the AMS-film,

wherein the starting temperature is between 15 and 40 degrees Celsius [[36°C]].

19. (previously presented) The method according to claim 3, wherein the starting temperature is 36°C.

20. (previously presented) The method according to claim 3, wherein the AMS-film is charged at a maximum allowable corona discharge current that the AMS-film can withstand before the film surface becomes destroyed by the positive ion bombardment, and the charging is continued up to the highest achievable potential before local breakdowns begin to occur, in order to achieve the maximum signal to noise ratio in the holographic image, which increases the number of operation cycles the AMS-film can withstand without loss of

quality in hologram recordings.

21. (previously presented) The method according to claim 3, further comprising the step of:

restricting the development of the geometrical relief by a pre-set value of a diffraction efficiency of the holographic image.

22. (previously presented) The method according to claim 3, further comprising the steps of:

erasing the AMS-film for recording additional holograms; and

illuminating the AMS-film by a flash lamp simultaneously with the heating of the film during the erasing process such that bulk and surface charges of the AMS-film are removed, in order to increase the number of recording cycles the AMS-film can withstand before holographic sensitivity is reduced to a level at which the AMS-film must be replaced and in order to reduce the erasing time and temperature of the AMS-film.

23. (previously presented) The method according to claim 22, further comprising the step of:

restricting the erasing process by a pre-set value of the diffraction efficiency.

24. (previously presented) The method according to claim 18,

wherein the AMS-film is charged at a maximum allowable corona discharge current that the AMS-film can withstand before the film surface becomes destroyed by the positive ion bombardment, and the charging is continued up to the highest achievable potential before local breakdowns begin to occur, in order to achieve the maximum signal to noise ratio in the holographic image, which increases the number of operation cycles the AMS-film can withstand without loss of quality in hologram recordings.

25. (previously presented) The method according to claim 18, further comprising the step of:

restricting the development of the geometrical relief by a pre-set value of a diffraction efficiency of the holographic image.

26. (previously presented) The method according to claim 18, further comprising the steps of:

erasing the AMS-film for recording additional holograms; and

illuminating the AMS-film by a flash lamp simultaneously with the heating of the film during the erasing process such that bulk and surface charges of the AMS-film are removed, in order to increase the number of recording cycles the AMS-film can withstand before holographic sensitivity is reduced to a level at which the AMS-film must be replaced and in order to reduce the erasing time and temperature of the AMS-film.

27. (previously presented) The method according to claim 26, further comprising the step of:

restricting the erasing process by a pre-set value of the diffraction efficiency.

28. (previously presented) The method according to claim 18, wherein, when the method is applied for double exposure holographic interferometry, the development of the latent electrostatic image of a first exposure converts the latent electrostatic image into a latent image such as a photo-electret image, by pulse heating the AMS-film by applying a pulsating electric current on the transparent conducting sub-layer and subsequently illuminating the AMS-film by a flash-lamp followed by recharging the surface of the AMS-film to an initial operating surface potential.

29. (currently amended) The method according to claim 18, wherein the starting temperature of the heating of the AMS-film, during development of the latent electrostatic image, is 36 degrees Celsius ~~within the range from 15 to 40°C~~.

30. (previously presented) The method according to claim 18, wherein the heating rate of the AMS-film, during development of the latent electrostatic image, is in the order of 10^6 °C/sec.

31. (previously presented) The method according to claim 18, wherein, when the temperature of the AMS-film is within the range from 15 to 40°C, the optimum charging potential of the film surface is 125 V/μm and the maximum charging current is 1 $\mu A/cm^2$.

32. (previously presented) The method according to claim 18, wherein the diffraction efficiency is measured with a photo-sensor installed in zero diffraction order.

33. (previously presented) The method according to claim 18, wherein the heating of the AMS-film, during development of the latent electrostatic image into a geometrical relief at the surface of the AMS-film, is terminated when the measured diffraction efficiency reaches a pre-set value in the range of 0.005-30% or if the time derivative of the measured diffraction efficiency reaches a termination condition.

34. (previously presented) The method according to claim 18, wherein, when the latent electrostatic image is developed into a photo-electret image, the pulse pre-heating of the AMS-film is terminated when the measured diffraction efficiency of the restored holographic image reaches a pre-set value of 0.05%, and when the geometrical relief at the film surface, which corresponds to the developed image of the hologram, becomes erased in order to reset

the AMS-film, the heating of the AMS-film is terminated when the measured diffraction efficiency of the restored holographic image reaches a pre-set value of 0.01 %.

35. (previously presented) The method according to claim 18, wherein the termination condition is either when the calculated time derivative of the measured diffraction efficiency changes sign from a positive to a negative value or when the absolute value of the time derivative of the measured diffraction efficiency becomes less than a threshold value which is close to zero.

36. (previously presented) The method according to claim 18, wherein the photo-electret image has a lifetime of up to 20 hours.

37. (previously presented) The method according to claim 18, wherein the AMS-film achieves a holographic sensitivity of up to 1650 m^2/J, a resolution of up to 1700 mm^{-1}, and a signal-to-noise ratio up to 125.

38. (new) A method for forming optical holograms on an amorphous molecular semiconductor (AMS) film deposited on a transparent conducting sub-layer, the method steps for the formation of a holographic image comprising:

charging a surface of the AMS-film by a corona discharge,

wherein the surface of the AMS-film is charged at a maximum allowable corona discharge current that the AMS-film can withstand before the film surface becomes destroyed by the positive ion bombardment, and the charging is continued up to the highest achievable potential before local breakdowns begin to occur, in order to achieve the maximum signal to noise ratio in the holographic image, which increases the number of operation cycles the AMS-film can withstand without loss of quality in hologram recordings;

reducing the electron and hole components of the dark conductivity of the AMS-film by pulse heating the AMS-film when it has reached the operating surface potential, in order to increase resolution and holographic sensitivity of the AMS-film;

initiating the heating of the AMS-film for developing the electrostatic image into a geometrical relief at the optimal start temperature and heating the AMS-film at an optimal heating rate, in order to additionally increase the resolution and holographic sensitivity of the AMS-film, up to optimum reproducible levels;

creating a latent electrostatic image of a desired holographic image of an object on the surface of the AMS-film;

developing the latent electrostatic image into a geometrical relief at the surface of the AMS-film;

restricting the development of the geometric relief by a pre-set value of a diffraction efficiency of the holographic image;

erasing the AMS-film for recording additional holograms;

illuminating the AMS-film by a flash lamp simultaneously with the heating of the film during the erasing process such that bulk and surface charges of the AMS-film are removed, in order to increase the number of recording cycles the AMS-film can withstand before holographic sensitivity is reduced to a level at which the AMS-film must be replaced and in order to reduce the erasing time and temperature of the AMS-film; and

restricting the erasing process by a pre-set value of the diffraction efficiency,

wherein the AMS-film comprises 92 wt% of a copolymer comprising N-epoxypropylcarbazole and 5 wt% butylglycidyl ether, doped with 5 wt% of methyl-9-(4-dodecyl-oxyphenyl-1,3-selenathiol-2-ylidene) -2,5,7-trinitrofluorene-4-carboxylate and 4 wt% of hexadecyl-2,7-dinitro-dicyanomethylenfluorene-4-carboxylate.